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Complete Endovascular Management of a Spontaneous Aorto-left Renal Vein Fistula Caused by Ruptured Abdominal Aortic Aneurysm Under Local Anaesthetic: A Case Report

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Introduction: Aorto-left renal vein fistulae (ALRVF) are extremely rare, with few cases reported in the literature. We report the first case of complete endovascular management of a spontaneous ALRVF secondary to a ruptured abdominal aortic aneurysm (AAA) under local anaesthetic.

Report: A 73-year-old man presented with acute left loin pain and haematuria. A CT scan demonstrated an infra-renal AAA, rupturing posteriorly into a retroaortic left renal vein. Given aneurysm suitability and patient factors, this was treated by endovascular management.

Discussion: Open operations in such cases are associated with high morbidity and mortality. Endovascular stenting provides a lifesaving alternative.

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CASE PRESENTATION

A 73-year-old man presented to our emergency department (ED) with acute left loin pain and haematuria. He had attended our ED department 4 days previously for acute dyspnoea where a pulmonary embolus was suspected, but was later disproved by computed tomography (CT) pulmonary angiography. His only known medical history was of an abdominal aortic aneurysm (AAA) measuring 3.7 cm 6 years previously, but was lost to surveillance. On arrival to the ED, the patient was visibly short of breath with a respiratory rate of 26 breaths/minute, hypertensive at 165/91 mmHg, and tachycardic at 105 beats/minute. Physical examination demonstrated left abdominal tenderness with a central pulsatile mass with a noted 'machinery murmur' in the upper abdomen. Initial investigations demonstrated a normal electrocardiogram, haemoglobin of 16.0 g/dL, white cell count $20.2 \times 10^9/L$, with normal liver and renal function tests. An emergency CT scan demonstrated a 7.2 cm infra-renal AAA extending to the aortic bifurcation, rupturing posteriorly into a retroaortic left renal vein (Fig. 1).

Operative management

As a result of the patient being lost from our surveillance clinic, there was concern over the patient's fitness for open surgery. Because of the patient's shortness of breath of unknown aetiology at presentation, and therefore possibility of underlying cardiorespiratory co-morbidities, and

given the suitability of the aneurysm, we decided to proceed to endovascular management under local anaesthetic. Bilateral inguinal cut-downs were performed to expose and control the common femoral arteries. A bifurcated Cook Zenith Flex stent graft was deployed with exclusion of the ALRVF. Total procedure time was 150 minutes with a radiology procedure time of 80 minutes. The patient was subsequently moved to the intensive care setting (ICU) for post-procedure care.

Post-operative care

After surgery, the patient complained of left-sided abdominal pain. Three CT scans demonstrated no cause for the patient's symptoms. The abdominal pain persisted and with localised peritonism, on the seventh post-operative day, a laparotomy was performed for the clinical suspicion of bowel ischaemia. Intraoperatively, there was entire necrosis of the sigmoid colon with a perforation at the apex of a sigmoid loop, requiring a Hartmann's procedure. The patient remained in hospital for 43 days before transfer to a local unit for continued rehabilitation. At 4-month follow-up, the patient continued to improve clinically with stable AAA sac size, no demonstrable endoleak, and patent left renal vein, a further CT has been arranged for 12 months following surgery.

DISCUSSION

This rare clinical presentation was first described by DeBakey et al. in 1958,¹ and since then approximately 30 cases have been reported in the literature. It is thought that fistulation arises from local pressure-related necrosis and/or a peri-aortic inflammatory reaction.^{2,3} The incidence of a retro-aortic left renal vein is estimated at less than 4%, based on review of CT scans and cadaveric specimens.²

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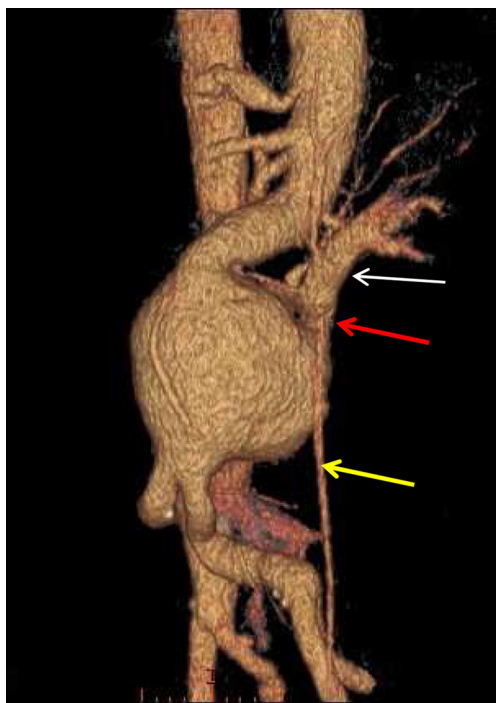


Figure 1. Three-dimensional computed tomography scan demonstrating a 7.2-cm infra-renal abdominal aortic aneurysm (AAA), rupturing posteriorly into retro-aortic left renal vein fistula (red arrow). Renal vein (white arrow), spermatic vein (yellow arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

During embryological development at 5–7 weeks, the renal veins are formed from an anastomosis which arises between supracardinal and subcardinal veins, forming a renocaval arch and embryonic collar around the pararenal aorta⁴ (Fig. 2). Failure of the dorsal aspect of this to disintegrate results in a retro aortic renal vein. There are various symptoms related to this clinical syndrome, but most commonly it is associated with haematuria, abdominal, or flank pain, a mechanical abdominal bruit, and a pulsatile abdominal mass;⁵ all these symptoms were found in our patient. Furthermore, approximately 10% of patients present with symptoms of heart failure which could explain our patient's initial presentation 4 days previously with dyspnoea, initially presumed to be a pulmonary embolus. Of the 30 or so cases documented, only four describe some aspect of endovascular management. This case was complicated by development of colonic ischemia postoperatively, presumably by exclusion of the inferior mesenteric artery compounded by increased venous pressure within the sigmoid colon caused by the ALRVF. This is the first reported complete endovascular treatment of this condition with

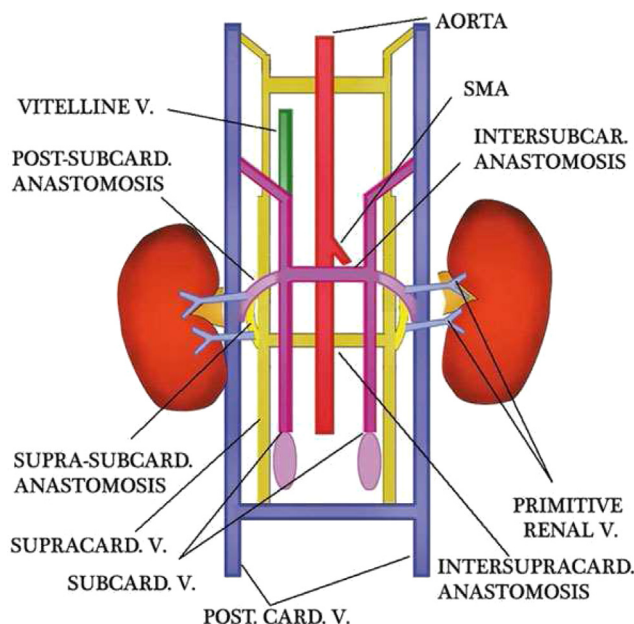


Figure 2. Normal embryological development at 5–7 weeks demonstrating formation of the renal veins by an anastomosis arising between supracardinal and subcardinal veins.⁴

successful exclusion and subsequent closure of the ALRVF. For patients considered unfit for open procedure, endovascular stenting provides a safe and lower risk lifesaving alternative.

CONFLICT OF INTEREST

None.

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